regarding the relative effects of high or low dew points on the nocturnal temperature fall from 4:40 p. m. data.

For example, the dew point on April 27, 1918, was 11° F. at 4 p. m. and 22° F at 5 p. m. By 7:30 p. m. it had risen to 35° F. During the rest of the night it ranged between 25° and 30° F. On the night of April 25, 1918, the dew point was 30° F. at 4 p. m. and 26° F. at 5 p. m., and varied between 26° and 32° F. during the night. In these two cases the effect of atmospheric moisture in retarding radiation, and the amount of heat liberated in condensation and freezing were practically the same, yet the values of the afternoon dew-point temperatures would indicate widely different effects.

It is believed that an analysis of the so-called Young hygrometric formula, described in (1), modifications of which are being used in fifteen different fruit-frost districts on the Pacific coast, will disprove the statement that the dew point is "nominally of great importance," which appears in the conclusion of the paper under discussion. Moisture effects are given their proper weight in the formula and no more.

The paper under discussion is an interesting and valuable theoretical discussion of minimum temperature-forecasting methods, in which points which have been accepted, as self-evident or not explained in detail heretofore, are brought out by mathematical anlaysis. However, in the writer's opinion, based on experience in minimum temperature forecasting in the Pacific Coast States, the forecasting methods suggested by the author are considerably more complicated than those now in use, and will not increase the accuracy of the results being obtained with present methods. It is the writer's contention that while formulas developed from data secured on "radiation" nights, or nights on which the temperature fell to or near the freezing point are of great value in minimum temperature forecasting, it is just as impracticable with our present knowledge of forecasting to use formulas to determine when wind or clouds will prevent a fall in temperature to the freezing point or when an influx of cold, dry air will cause the temperature to fall unusually low, as it is to forecast rains or gales at any given point by formula. Successful noon forecasts of minimum temperature for the following morning at Pomona have been made for several years when general orchard heating is in prospect, through the use of the morning weather chart alone, without the use of a formula.

In the preparation of minimum temperature forecasts in the evening, the time factor is important, since the later the forecasts are given to the public the less valuable they become. The system of forecasting used should be as simple as possible without sacrificing accuracy. The type of formula used, whether curves or equations with corrections, is entirely a matter of the personal preference of the forecaster, and is unimportant from the standpoint of results obtained.

LITERATURE CITED

(1) Forecasting Minimum Temperatures in Oregon and California, by Floyd D. Young. MONTHLY WEATHER REVIEW, Supplement No. 16, pp. 53–55.

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REJOINDER

By ESEK S. NICHOLS, San Jose, Calif., May 23, 1930

Referring to discussion by Mr. Floyd D. Young:

Mr. Young has well emphasized the complications and difficulties of minimum-temperature forecasting, which have occasioned the large amount of study that has been devoted to the subject without, we may say, completely solving our problem. Also, he has very properly emphasized the use of the weather map, which is of course indispensable.

In his ninth paragraph he advises raising or lowering the formula estimate according to estimated effects of modifying influences. This implies a quantitative estimate in degrees of such effects, and it is difficult to see why an auxilliary curve or curves can not be drawn to express them. Consider, for example, the clearing conditions at Medford referred to in the last sentence of his fourth paragraph. We should have an auxilliary curve for cases when the sky clears at about 9 p. m. and another curve for use if clearing occur at 2 or 3 a. m.; deciding in the evening which if either curve to use, after considering the weather map and other available helps.

Evidently he overestimates the number of classifications and auxilliary curves that would be required; for modifying conditions fall into great classes or types, as do conditions producing rainfall, for example. Classification may be based on weather map wholly or in part; see, for example, types for Grand Junction, Colo. (3) and (6).

Mr. Young's statement regarding the importance of current temperature in determining nocturnal cooling is exactly in accord with my remark that the dew point is "nominally" of great importance in hygrometric formulas; since dew point appears prominently whereas current temperature does not specifically appear in those formulas. Also, his statement accords with my paper as a whole, since my principal purpose is, as indicated in the title and in the conclusion, to advocate the predicting of minimum temperatures from preceding, or current, temperatures and to develop a method of predicting on that basis. This paper is presented as outlining a general method of attacking the problem of minimum temperature forecasting.